Table 1 Frequencies of HLA Class I Alleles That are Known to Serve as HIV CTL Restriction Elements in Four Populations

	Frequencies*					
HLA	African	USA	North American			
Alleles	Americans	Caucasians	Indians	Thais		
A2	16.7	28.3	25.5	25.5		
A3	8.9	12.2	2.9	1.5		
AII	2.3	5.5	1.0	32.5		
A24	4.7	9.6	19.6	14.6		
A28	10.9	4.5	6.9	0.8		
A30	9.5	2.6	2.0	1.1		
A31	1.7	2.0	27.5	1.7		
A32	1.0	5.1	2.0	0.2		
A33	8.1	1.0	1.0	13.6		
B 7	8.3	10.0	3.9	2.7		
B8	3.2	10.0	5.6	0.2		
B12 (44)	6.2	10.4	3.9	5.4		
B13	0.9	3.0	1.0	9.3		
B14	3.0	4.1	2.9	0.4		
B17	10.9	4.9	1.0	8.1		
B18	3.3	4.9	1.0	2.5		
B27	1.6	4.1	2.9	6.0		
B35	7.7	8.5	18.6	2.5		
B37	0.9	2.2	0.0	1.4		
B52	1.1	1.2	2.9	3.1		
B53	12.8	0.8	0.0	0.0		
B57	4.2	3.9	1.0	5.2		
B60	1.3	4.5	2.9	8.3		
B62	1.4	5 .5	4.9	5.0		
Cw3	9.6	12.6	22.4	15		
Cw4	21.0	9.8	15.4	6		

*Frequencies for HLA-A and HLA-B alleles are taken from HLA 1991 [21], HLA-C for African Americans and USA Caucasians are taken from Histo-compatibility Testing 1984 [19], HLA-C for North American Indians from Williams and McAuley, 1992 [22], and HLA-C for Thais from the Proceedings of the Second Asia and Oceania Histocompatibility Workshop Conference [23].

Table 2 Proportion of each of the four populations that would be predicted to present peptides to the immune system

Population	HLA Restriction Elements Chosen	HIV Protein	Epitope Location	Epitope	
a) African Americans	A2, A3, A11, B35	nef	73–82	OVPLRPMTYK	
	A28, B14	gp41	583-592	VERYLKDÇQL	
	A30, B8	gp41	844-863	RRIRQGLERALL	
	B17, B37	nef	117-128	TÇGYFPÇWQUYT	
	Cw4	gp120	576-383	(S) FNCGGEFF	
(Proportion of African	Americans expected to	present thes	e 5 epitopes is	92.3%)	
b) USA Caucasians	A2, A3, A11, B35	nef	73-82	QVPLRPMTYK	
	A30, B8	gp41	844-863	RRIRQGLERALL	
	B7	gp120	302-312*	RPNNNTRKSI	
		nef	126-138*	NYTEGEGVRYPLT	
	B12	p24	169-184	IPMFSALSEGATPQDL	
(Proportion of USA Cau	ucasians expected to pr	esent these	‡ epitopes is 90	0.2%)	
c) North American	A2, A3, A11, B35	nef	73-82	QVPLRPMTYK	
Indians	A24	gp4 I	584-591*	AFKDÖÖF	
		nef	120-144*	YFPDWQNYTPGPGIRYPLTFGWCYK	
	A31	gp41	770-780	RLRDLLLIVTR	
(Proportion of North An	nerican Indians expect	ed to presen	t these 3 epitoj	nes is 96.4%)	
d) Thais	A2, A3, A11, B35	nef	73-82	QVLRPMTYK	
	A24	gp41	584-591*	YLKDQQL	
		nef	120-144*	YFPDWQNYTPGPGIRYPLTFCGWCYK	
(Proportion of Thais expected to present these 2 epitopes is 93.6%)					
e) African Americans	A2, A3, A11, B35	nef	73-82	QVPLRPMTYK	
USA Caucasians Noπh American	A28, B14	gp41	583-592	VERYLKDÇQL	
Indians	A30, B8	gp41	844-863	RRIROGLERALL	
Thais	B17, B37	nef	117-128	TQGYFPQWQNYT	
	Cw4	gp120	376-383	(S) FNCGGEFF	
	B 7	gp120	302-312*	RPNNNTRKSI	
		nef	126-138*	NYTPGPGVRYPLT	
	B12	p24	169-184	IPMFSALSEGATPQDL	
	A31	gp4 I	770-780	RLRDLLLIVTR	
	A24	gp4 l	584-591*	ALKDÖĞF	
		nef	120-144*	YFPDWQNYTPGPGIRYPLTFCGWCYK	

(Proportions of African Americans, USA Caucasians, North American Indians, and Thais expected to present these 9 epitopes are 95.4%, 97.5%, 99.4%, and 97.2%, respectively)

^{*}The criteria upon which choices among peptides should be made are not yet known. It may be important to choose peptides that have been reported to be immunogenic in non-progressors to AIDS or that have been reported to induce immunodominant anti-HIV T-cell responses.



TABLE 3

Th-CTL Pepude Prototype Vaccine Immunogens for Testing in Either Mice, Rhesis Macaque or Human

Vaccine number	Name of Pepudes	Species us which o be studied	Amuno acid sequence	Restricting elements for CTL epitope
	Mouse HIV-1 Th-CTL epitopes	OC SUBCION	Th - CTL	TC 15 cpilope
	A-TMA-CTL	Youse	HAGPIAPGCMREPRG-KQIIIMMQEVGKAMYA	H-3=
	B-Th/8-CTL	Mouse	KEKVYLAWVPAHKGIG-MYAPPIGGQI	H-2 K'
	C-Th/C-CTL	Mouse	QLLFIHFRIGCRHSR-DRVIZVVQGAYRAIR	H-Zenne (Da)
	D-TIVD-CTL	Mouse	ECMHEDIISLWDQSL-RIHIGPGRAFYTTKN	H-2 D*
	Macaque SIV/HIV-1 Th-CT1		Th - CTL	
	Thi/CTL/SIV Gug	Macaque	ELYKYKVVKIEPLGVAPTKA-CTPYDINGM	Mamu-A*01
	Th2/CTL/SIV Pol	Macaque	VST/CCTHGIRPVVSTQLLL-STPPL/RL	Mamu-A*01
	Th3/CTL/HIV-1 Env	Масадие	STSIRGKVQKEYAFFYKLDI-YAPPISGQI	Mamu-A*01
	Macaque SIV/HIV-1 Th-CTL			
	pllc epitopes variants	l Wa	Th - CTL ELVSYKVVKIEPLGVAPTKA-CTPYDINGM	34
	Thi/CTL/SIV Gug	Macaque		Mamu-A *01
	The CTL SIV Gagpilal-Y	Macaque	VSTVQCTHGIRPVVSTQLLL-CTPYDYNQML	Mamu-A*01
	Th3/CTL/ SIV Gag/pillel-A	Macaque	STSIRGKVQKEYAFFYKLDI-CTPYDANQML	Mamu-A*91
	Th+/CTL/ SIV Gug/pl lc/l-D	Macaque	SYAFFYKLDIIPIDNDTTSY-CTPYDDNQML	Mamu-A*01
	Th5/CTL/ SIV Guypt lef-K	Macaque	REQFGNAKTIIFKQSSGGDPE-CTPYDKNQML	Mamu-A*01
6.	Human HIV-1 Th-CTL overlapping epitopes		Th - CTL	
	A-TWA-CTL	Human	KGIINMMQEVGKAMYA-KAFSPEVIPMF	HLA B57.B53
	B-Th/B-CTL	Human	YERWIILGLNEIVRMYS-NPPIPUGEIVRRWI- ILGLNEIVRMYSPTSI	HLA B35.B8.B27.A33.Bw62.B52
	C-Th/C-CTL	Human	DRVIEVVQGAYRAIR-VGFPVRPQVPLRPMTYK	HLA A1.37.38.835.A11.A2.A3.A3
	D-TIvD-CTL	Human	ASLWNWENITWWLWY-WVYHTQGFF90WQNYT9	HLA 87.857.A1.88.B18.835
8.	Human HIV-1 Th-dominant/			
—	subdominant CTL epitopes A-Th/E-CTL	Human	Th - CTL KOLLNMOSVGKAMYA-SLYNTVATL	HLA A2
	B-Th/F-CTL	Human	YKRWIIIGLNKIVRMYS-KIRLRPGGK	HLA A3
	C-Th/G-CTL	Human	DRVIEVVQGAYRAIR-KRMIILGLNK	HLA B27
	D-TWH-CTL	Human	ASLIVNWFNITNWLWY-GGKKKYKL	HLA 38
	E-TIVI-CTL		MREPRGSKIAGTTST-ERYLKDQQL	HEA BI4
10.	Human HIV-1 Th-CTL p17		7	
	epitope (A2 Variants) B-Th/E-CTL	Human	Th - CTL YKRWIILGLNKIVRMYS-SLYNTVATL	HLA A2
	C-TIMI-CTL	Human	DRVIEWVQGAYRAIR-SLFNTVATL	HLA A2
·	A-TWK-CTL	Human	QIENMWQEVGKAMYA-SLYNAVATL	HLA A2
	D-TIVL-CTL	Human	ASLWNWFNITNWLWY-SLYNTVAVL	HLA A2
	E-TlyM-CTL	Human	MREPRGSKIAGTTST-SLFMLLAVL	HLA A2

Vaccine	Name of Pentides	Amino acid sequence	Restricting elements for
11.	Human HIV-1 Th-CTL overlapping epitopes	Th - CTL	
	A*-Th/J-CTL		A2, A202,A5, B7, B14, B57, B5701, B5801, B02, Cw3
	A*-TWK-CTL		A2.A25, A26, B7, B12, B14, B1402, B27, B39, B52, B53, B57, B58, B8101, Cw8, Cw0102
	A*-Th/L-CTL		A2,A202,A5,A24,A2402,A25,A26, A33, B7, B8,B12, B14 B35,B39, B44, B52, B53Bw62, B27, B2705, B57, B5701, B70, B71,Bw62,
	A*-Th/M-CTL	KQIINMWQVVGKAMYA- KIRLRPGGKKKYKLKHIVWGSEELRSLYNTVATLYCVHQRI	Cw3, Cw8, Cw0401 A1,A2,A3, A3.1,A03, A11, A23, A24, A0201, A2402, B8, B27, B42, B62, Bw62, Cw4



Table 4

MVA-1 HIV-1 mouse Th-CTL epitopes in A-Thos24(H-2 b) A-CTL/gpl20(H-2 db) B-Th/RT (H-2 dk) B-CTL/gpl20(H-2 d) HAGPLAPGQMREPRG - KQ11MMQEVGKAMYA - KEKVYLAWVPAHKGIG - MYAPPIGGGI - CTh/vgr(H-2 d) C-CTL/gpl4(H-2 dpaq (D-d) D-Th/gpl20(H-2 d) D-CTL/gpl20(H-2 d) D-CTL/
HAGPIAPOQNEERG RQLINEWQEVERAMYA KEKYYLAWPAHKGIG MYAPPIGGI - C.Thvor (H.2 \$) C.CTLgp41 (H.2 dpaq (ID d) D.Thvgp120(H.2 d) D.CTLgp120(H.2 d) QLLFIHFRIGGRES DRVIEVVGAYRAIR SQMHEDITSLWDQSL RIHIGPGRAFYTTKN MVA-2) p55/gag + the same HIV-1 mouse Th-CTL epitopes in MVA-1 MVA-3) HIV-L/SIV Th-CTL epitopes in Thl/gp120/DRB*w201 CTLSIV Gag (Mamu-A*01) Th2/gp120/DRBF*s406 CTLSIV Pol (Mamu-A*01) ELYKYKVVKIEPLGVAPTKA CTYVENYQCTHGIRPVVSTQLLL STEPLYRL Th3/gp120 CTLHIV-I Eav (Mamu-A*01) Th3/gp120 CTLHIV-I Eav (Mamu-A*01) Th2/DRBF*s406 CTLGagp110-I-Y Th3/gp120 CTLSIV Gag (Mamu-A*01) Th2/DRBF*s406 CTLGagp110-I-Y Th3/gp120 CTLSIV Gag (Mamu-A*01) Th2/DRBF*s406 CTLGagp110-I-Y Th3/gp120 CTLSIV Gag (Mamu-A*01) Th2/DRBF*s406 CTLGagp110-I-Y Th3/gp120 CTLGagp110-I-A Th4/gp15 CTLGagp110-I-Y Th3/gp120 CTLGagp110-I-A Th4/gp15 CTLGagp110-I-D Th3/gp120 CTLGagp110-I-A Th4/gp15 CTLGagp110-I-D Th3/gp120/ASCHAFFYKLD CTPYDENQML CTPYDENQML Th3/gp120/ASCHAFFYKLD CTPYDENQML CTPYDENQML Th3/gp13 CTLGagp110-I-A Th4/gp15 CTLGagp110-I-D RGPGINKTIFKQSSGGDPS CTPYDENQML B-THGTHINIO-I-B B-CTLP-MI21-I-S0 KQIINMWQEVGKAMYA KAFSPSVIPMF YKRWITLGLNKV/RMYS NP9 12/MGETYKRWITLGLNKT/RMYSPTSI CTMgp1/3/1-331 CTLDR/g-H-30 D-Th/gp1/1/3-1-II D-CTLN/g/II-LST DRVTEVVGQAYRALT VGFFVRB/WTE ASLANAMFNI INWLWY WVHTQGFFPBWQNYP Restricting elements for CTL epitopes A-CTL epitopes HLA B5/B8/B3/A1/A3/Bw6/B5: CTL epitopesHLA B5//B8/B3/A1/A2/A3/A31): D-CTL epitopesHLA B5/B8/B3/A1/BB/B1/B3/S MVA-7) p55 gag + the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
C-CTL/gpt1 (H-2 d) C-CTL/gpt1 (H-2 dptq (D-T)/gpt20(H-2 d) D-CTL/gpt20(H-2 d) D-CTL/gpt20(D-CTL/graphical d) D-CTL/gpt20(D-CTL/graphical d) D-CTL/gpt20(D-CTL/graphical d) D-CTL/gpt20(D-CTL/graphical d) D-CTL/gpt20(D-CTL/graphical d) D-CTL/graphical d) D-CTL/gr
MVA-2) p55/gag + the same HIV-1 mouse Th-CTL epitopes in MVA-1 MVA-3) HIV-1/SIV Th-CTL epitopes in Th/gp120/DR3*w.01 CTLSIV Gag (Mamu-4*01) Th/gp120/DR3I*S406 CTLSIV P01 (Mamu-4*01) ELYKYKVVKIEPLGVAPTKA
MVA-3
Thi/gp120/DRB*w201
ELYKYKVVKIEPLGVAPTKA- CTPYDINGM- VSTVQCTHGIRPVVSTQLLLSTSPLVRL- Thi/gp120
MVA-4) p55/gag + the same HIV-1/SIV Th-CTL epitopes in MVA-3 MVA-5) SIV Th-CTL p11c epitope variants in Thi/DRB*w201 CTLSIV Gag (Mamu-A*01) Th2/DRBI*\$406 CTLGagon (of-Y) ELYKYKVVKEPLGVAPTKA
MVA-5) SIV Th-CTL p11c epitope variants in Th1/DRB*w201 CTLSIV Gag (Mamu-A*01) Th2/DRBI*\$406 CTLGagp1:0/-Y ELYKYKVVKIEPLGVAPTKACTPYDINQMLV\$TVQCTHGIRPVV\$TQLLLCTPYDYNQML- Th3/P14 CTLGagp1!0/-A Th4/P15 CTLGagp1!0/-D -ST\$IRGKVQKEYAFFYKLDICTPYDANQMLEYAFFYKLDIIPIDNDTTSYCTPYDNQML- Th5/P33 CTLGagp1!0/-K -REQFGNNKTIIFKQ\$SGGDPECTPYDKNQML MVA-6) HIV-1 human Th-CTL overlapping epitopes in A-Th/gp120//422-437 A-CTL024/30-40 B-Th/GTH1/130-146 B-CTL/P24/121-150 KQIINMWQEVGKAMYAKAF\$PEVIPMFYKRWIILGLNKIVRMYSNPPIPVGEIYKRWIILGLNKIVRMY\$PT\$I C-Th/gp41/317-331 C-CTL/Net/64-80 D-Th/gp41/157-171 D-CTL/Net/III-127 -DRVIEVVQGAYRAIRVGFPVRPQVPLRPMTYKASLWNWFNITNWLWYWVHTQGFFPDWQNYTP Restricting elements for CTL epitopes: A-CTL epitope=HLA B57/B58: B-CTL epitope=HLA B35/B8/B27/A33/Bw62/B52: C-CTL epitope=HLA A1//B7/B8/B35/A11/A2/A3/A31): D-CTL epitope=HLA B7/B57/A1/B8/B19/B35. MVA-7) p55 gag +the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
Thi/DRB*w201 CTLSIV Gag (Mamu-A*01) Thi/DRBI*\$406 CTLGagpt.tof-Y ELYKYKVVKIEPLGVAPTKACTPYDINQMLVSTVQCTHGIRPVVSTQLLLCTPYDVNQML- Thi/P14 CTLGagpt.tof-A Thi/P15 CTLGagpt.tof-D -STSIRGKVQKEYAFFYKLDICTPYDANQMLEYAFFYKLDIIPIDNDTTSYCTPYDNQML- Thi/P13 CTLGagpt.tof-K -REQFGNNKTIIFKQSSGGDPECTPYDKNQML MVA-6) HIV-1 human Th-CTL overlapping epitopes in A-Th/gp120//422-437 A-CTL 024/30-40 B-Th/GTH1/130-146 B-CTL/P24/121-150 KQIINMWQEVGKAMYAKAFSPEVIPMFYKRWIILGINKLVRMYSNPPIPVGETYKRWIILGINKLVRMYSPTSI C-Th/gp41/317-331 C-CTL/Net/64-80 D-Th/gp41/157-171 D-CTL/Net/I11-127 -DRVIEVVQGAYRAIRVGFPVRPQVPLRPMTYKASLWNWFNIITNWLWYWVHTQGFFPDWQNYTP Restricting elements for CTL epitopes: A-CTL epitope=HLA B57/B58: B-CTL epitope=HLA B35/B8/B27/A33/Bw62/B52: C-CTL epitope=HLA A1//B7/B8/B35/A11/A2/A3/A31): D-CTL epitope=HLA B7/B57/A1/B8/B19/B35. MVA-7) p55 gag +the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
ELYKYKVVKIEPLGVAPTKA——CTPYDINQML——VSTVQCTHGIRPVVSTQLIL——CTPYDYNQML— Th3/P14
Th3/P14 CTL Gayptlot-A Th4/P15 CTL Gayptlot-D -STSIRGKVQKEYAFFYKLDI CTPYDANQML
- STSIRGK/QKEYAFFYKLDIICTPYDANQMLEYAFFYKLDIIPIDNDTTSYCTPYDDNQMLTh5/P33 CTLGJg/p11c/t-K -REQFGNNKTIIFKQSSGGDPECTPYDKNQML MVA-6) HIV-1 human Th-CTL overlapping epitopes in A-Th/gp120//422-437 A-CTLD24/30-40 B-Th/GTH1/130-146 B-CTL/P24/121-150 KQIINMWQEVGKAMYAKAFSPEVIPMFYKRWIILGLNKIVRMYSNPPIPVGEIYKRWIILGLNKI/RMYSPTSI
-REQFGNNKTIIFKQSSGGDPECTPYDKNQML MVA-6) HIV-1 human Th-CTL overlapping epitopes in A-Th/gp120//422-437 A-CTL p.24/30-40 B-Th/GTH1/130-146 B-CTL/P24/121-150 KQIINMWQEVGKAMYAKAFSPEVIPMFYKRWIILGLNKIVRMYSNPPIPVGETYKRWIILGLNKIVRMYSPTSI C-Th/gp41/317-331 C-CTL/Net/64-80 D-Th/gp41/157-171 D-CTL/Net/111-127 DRVIEVVQGAYRAIRVGFPVRPQVPLRPMTYKASLWNWFNITNWLWYWVYHTQGFFPDWQNYTP Restricting elements for CTL epitopes: A-CTL epitope=HLA B57/B58: B-CTL epitope=HLA B35/B8/B27/A33/Bw62/B52: C-CTL epitope=HLA A1//B7/B8/B35/A11/A2/A3/A31): D-CTL epitope=HLA B7/B57/A1/B8/B19/B35. MVA-7) p55 gag +the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
MVA-6) HIV-1 human Th-CTL overlapping epitopes in A-Th/gp120//422-437 A-CTL 0.24/30-40 B-Th/GTH1/130-146 B-CTL/P24/121-150 KQI INMWQEVGKAMYAKAF SPEVIPMFYKRWI ILGLNK I VRMYSNPPI PVGET YKRWI ILGLNK I VRMYS PTSI C-Th/gp41/317-331 C-CTL/Net/64-80 D-Th/gp41/157-171 D-CTL/Net/111-127 DRVI EVVQGAYRAIR VGF PVR PQV PLR PMTYK ASLWNWFNI TNWLWY WVYHT QGF F PDWQNYT P Restricting elements for CTL epitopes: A-CTL epitope=HLA B57/B58: B-CTL epitope=HLA B35/B8/B27/A33/Bw62/B52: C-CTL epitope=HLA A1//B7/B8/B35/A11/A2/A3/A31): D-CTL epitope=HLA B7/B57/A1/B8/B19/B35. MVA-7) p55 gag + the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
A-Th/gpi20//422-437
KQIINMWQEVGKAMYAKAFSPEVIPMFYKRWIILGLNKIVRMYSNPPIPVGEIYKRWIILGLNKIVRMYSPTSI- C-Th/gp41/317-331 C-CTL/Net/64-80 D-Th/gp41/157-171 D-CTL/Net/111-127 DRVIEVVQGAYRAIRVGFPVRPQVPLRPMTYKASLWNWFNIINWLWYWVYHTQGFFPDWQNYTP Restricting elements for CTL epitopes: A-CTL epitope=HLA B57/B58: B-CTL epitope=HLA B35/B8/B27/A33/Bw62/B52: C-CTL epitope=HLA A1//B7/B8/B35/A11/A2/A3/A31): D-CTL epitope=HLA B7/B57/A1/B8/B19/B35. MVA-7) p55 gag +the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
DRVIEVVQGAYRAIRVGFPVRPQVPLRPMTYXASLWNWFNITNWLWYWVYHTQGFFPDWQNYTP Restricting elements for CTL epitopes: A-CTL epitope=HLA B57/B58: B-CTL epitope=HLA B35/B8/B27/A33/Bw62/B52: C-CTL epitope=HLA A1//B7/B8/B35/A11/A2/A3/A31): D-CTL epitope=HLA B7/B57/A1/B8/B1\$/B35. MVA-7) p55 gag +the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
Restricting elements for CTL epitopes: A-CTL epitope=HLA B57/B58: B-CTL epitope=HLA B35/B8/B27/A33/Bw62/B52: C-CTL epitope=HLA A1//B7/B8/B35/A11/A2/A3/A31): D-CTL epitope=HLA B7/B57/A1/B8/B1\$B35. MVA-7) p55 gag +the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
A-CTL epitope=HLA B57/B58: B-CTL epitope=HLA B35/B8/B27/A32/Bw62/B52: C-CTL epitope=HLA A1//B7/B8/B35/A11/A2/A3/A31): D-CTL epitope=HLA B7/B57/A1/B8/B19/B35. MVA-7) p55 gag +the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
MVA-7) p55 gag +the same HIV-1 human Th-CTL overlapping epitopes in MVA-6 MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
MVA-8) HIV-1 Thdominant/subdominant CTL epitopes in
F CT (1702 26/A2) C Thiggs 1/3/1/3/1
[2 C.1.051.777 C.531.127
KQIINMWQEVGKAMYASLYNTVATLYKRWIILGINKIVRMYSKIRIRPGGKDRVIEVVQGAYRAIR-
G-CTLp24/131-140(B27) D-Th/gp41/157-171 H-CTLp17/24-31(B8) E-Th/p2496-110 I-CTLgp41/74-82(B14) KRWIILGLNKASLWNWFNITNWLWYGGKKKYKLMREPRGSKIAGTTSTERYLKDQQL-
MVA-9) p55/gag + the same HIV-1 Th-dominant/subdominant CTL epitopes in MVA-8
MVA-10) HIV-1 Th-CTL A2 p17 epitope (A2 Variants) in
B-Th/GTH1/130-146
YKRWIILGLNKIVRMYSSLYNTVATLDRVIEVVQGAYRAIRSLFNTVATL
K-CTLP17/RF D-TMgp4//157-171



HIV Polyvalent C4-V3 Peptides Studied in Guinea Pigs, Primates Or In Humans				
Peptide	gp120 C4 Region	gp120 V3 Region		
C4-V3MN	KQIINMWQEVGKAMYATR	PNYNKRKRIHIGPGRAFYTTK		
C4-V3RF	KQIINMWQEVGKAMYATR	PNNNTRKSITKGPGRVIYATG		
C4-V3EV91	KQIINMWQEVGKAMYATR	PGNNTRKSIPIGPGRAFIATS		
C4-V3CanOA	KQIINMWQEVGKAMYATR	PHNNTRKSIHMGPGKAFYTTG		
C4E9G-V3RF	KQIINMWQ G VGKAMYA T R	PNNNTRKSITKGPGRVIYATG		
C4E9V-V3RF	KQIINMWQ V VGKAMYA TR	PNNNTRKSITKGPGRVIYATG		
C4K12E-V3RF	KQIINMWQEVG E AMYA T F	PNNNTRKSITKGPGRVIYATG		
Sequences from the Los Alamos Database.				



TABLE 6

Th-CTL Peptide Prototype Vaccine Immunogens derived from HIV-1 gag

Vaccine number	Name of Pentides Human HIV-1 Th-CTL overlapping epitopes	Amino acud sequence Th - CTL	Restricting elements for CTL enitone
6	A-Th/A-CTL	KQIINMWQEVGKAMYA-KAFSPEVIPMF	B57,B58
6	B-Th/B-CTL	YKRWIILGLNKIVRMYS-NPPIPVGĖIYKRWIILGLNKIVRMYSPTSI	B35,B8,B27,A33,Bw62,B52
11	A*-Th/J-CTL	KQIINMWQVVGKAMYA-GQMVHQAISPRTLNAWVKVV	A2, A202,A5, B7, B14, B57, B5701, B5801, B02, Cw3
. 11	A*-Th/K-CTL	KQIINMWQVVGKAMYA-ATPQDLNTMLNTVGGHQAAMQMLKETINEEAAEW	A2,A25, A26, B7, B12, B14, B1402, B27, B39, B52, B53, B57, B58, B8101, Cw8, Cw0102
11	A*-Th/L-CTL	KQIINMWQVVGKAMYA-GPKEPFRDYVDRFYKTLRAEQASQEVKNWMT	A2,A202,A5,A24,A2402,A25,A26, A33, B7, B8,B12, B14 B35,B39, B44, B52, B53Bw62, B27, B2705, B57, B5701;
11	A*-Th/M-CTL	KQIINMWQVVGKAMYA- KIRLRPGGKKKYKLKHIVWGSEELRSLYNTVATLYCVHQRI	B70, B71,Bw62, Cw3, Cw8, Cw0401 A1,A2,A3, A31,A03, A11, A23, A24, A0201, A2402, B8, B27, B42, B62, Bw62, Cw4

A*-Th=C4E9V

Summary of restracting elements for CTL eptopes in Vaccines A, B, J, K, L and M

A: A1, A2 (02), (01), A3, A3.1, A5, A11, A23, A24 (02), A25, A26 and A33.

B: B7, B8, B12, B14 (02), B27 (05), B35, B39, B42, B44, B52, B53, B57 (01), B58 (01) B62 (w62), B70 and B71.

C: Cw3, Cw4, Cw0401 and Cw8.

HIV Th/CTL vaccine ABJKLM